



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/581,384	06/13/2000	HEINZ-JURGEN MUHLEN	PS-12772	1218

7590 05/11/2004

Fay Sharpe Fagan Minnich & McKee LLP
1100 Superior Avenue
Seventh Floor
Cleveland, OH 44114-2518

EXAMINER

RIDLEY, BASIA ANNA

ART UNIT PAPER NUMBER

1764

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

17

Office Action Summary	Application No.	Applicant(s)	
	09/581,384	MUHLEN ET AL.	
	Examiner Basia Ridley <i>BR</i>	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 55-109 is/are pending in the application.
- 4a) Of the above claim(s) 65-69,83-90,96,98 and 99 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 55-64,70-82,91-95,97 and 100-109 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>070300</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species B (directed to rotary drums, for example a rotary kiln), Species 2 (directed to heat carrier medium selected from the group consisting of sand, silicon, grit, aluminum silicate, corundum, graywacke, quartzite, cordierite, and mixtures thereof) and Species ii (directed to second reaction zone comprising a solid catalyst bed reactor behind a heat exchanger) filed on 17 February 2004 is acknowledged. Claim(s) 65-69, 83-84 and 87-88 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

2. Further, claim 85 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim, because it depends from non-elected claim 65.

3. Further, claims 86 and 89-90 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claims 86 and 89-90 recite a heat exchanger including a catalyst bed, therefore, claims 86 and 89-90 are not drawn to elected Species ii, which requires said catalyst bed to be located behind said heat exchanger, as set forth on page 6, lines 18-20 of instant specification.

4. Further, claims 96 and 98-99 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claim 96 recites a gas reactor at least partially included in an indirect heat exchanger, therefore, claims 96 and 98-99 are not drawn to elected Species ii, which requires said catalyst bed to be located behind said heat exchanger, as set forth on page 6, lines 18-20 of instant specification.

Information Disclosure Statement

5. The International Search Report dated 19 May 1999 cited in the information disclosure statement filed on 3 July 2000 have been considered, but will not be printed on any patent resulting from this application.

Specification

6. The amendment filed 13 June 2000 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

- the amendment to page 1, line 2 reciting "pyrolysis products including pyrolysis gases (...)" (see lines 4-5 of inserted paragraph) is not supported by original specification because the original specification only discloses the method wherein the "pyrolysis products consist of pyrolysis gases (...)" (see lines 6-7 of claim 1 as originally filed); the same objection applies to the amendment to page 2, lines 15-16 (see lines 6-7 of inserted paragraph) and amendment to page 6, before line 30 (see lines 4-5 of inserted paragraph);
- the amendment to page 6, before line 30 reciting pyrolysis at "temperature of about 550-650°C" and reaction of pyrolysis gases at "temperature of about 900-1000°C" (see lines 21-23 of inserted paragraph) is not supported by original specification, because the original specification only discloses pyrolysis at "temperature of 550-650°C" (P2/L30-31) and reaction of pyrolysis gases at "temperature of 900-1000°C" (P3/L2-3);
- the amendment to page 6, before line 30 reciting the "one or more" catalysts that are used simultaneously as heat carrier medium is not supported by original specification, because the original specification only discloses "the catalysts" that are used simultaneously as heat carrier medium (see

Art Unit: 1764

claim 6 as originally filed);

- the amendment to page 6, before line 30 reciting the heat carrier medium having “average grain size of about 1-40mm” is not supported by original specification, because the original specification only discloses heat carrier medium having “an average grain size of 1-40mm” (P6/L9).

Applicant is required to cancel the new matter in the reply to this Office Action.

7. The disclosure is objected to because of the following informalities:

- recitations “into pyrolysis products to form pyrolysis products” (see amendment filed 13 June 2000: amendment to page 1, line 2 (line 4 of inserted paragraph) and amendment to page 2, lines 15-16 (line 6 of inserted paragraph)) should be replaced with --into pyrolysis products, said pyrolysis products--;
- recitations “the heated carrier medium” (see amendment filed 13 June 2000: amendment to page 1, line 2 (line 6 of inserted paragraph) and amendment to page 2, lines 15-16 (line 8 of inserted paragraph)) should be replaced with --the heat carrier medium--;
- page 9, line 30 “leaves” should be replaced with --produces--.

Appropriate correction is required. Applicant is reminded that no new matter shall be added.

Claim Objections

8. Claims 55-64, 70-82, 91-95, 97 and 100-109 are objected to because of the following informalities:

- claim 55 recites “a heat carrier medium” (line 11), suggested correction is --the heat carrier medium--;
- claim 55 recites “heat carrier material” (line 13), suggested correction is --heat carrier medium--;
- claim 55 recites “forming” (line 16), suggested correction is --heating--;
- claim 55 recites “supplied heat” (line 19), suggested correction is --supplying heat--;

Art Unit: 1764

- claims 71-72 and 108 recite "corundum" twice;
- claims 75-76 recite "gases including tar", suggested correction is --gases include tar--;
- claim 91 recites "to at least partially cause at least partial pyrolysis" (lines 4), suggested correction is --to cause at least partial pyrolysis--;
- claim 91 recites "organic containing compound" (lines 4 and 5), suggested correction is --organic containing material--, both occurrences;
- claim 91 recites "heat carrier" (lines 10-11), suggested correction is --heat carrier medium--;
- claim 101 recites "said at partial reaction", suggested correction is --said reaction--;
- claim 102 recites "dry", suggested correction is --drying--;
- claim 103 recites "said preheating step including", suggested correction is --said preheating step includes--;
- claim 105 recites "dusting", suggested correction is --dedusting--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 55-64, 70-82, 91-95, 97 and 100-109 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically:

- most of the claims recite "at least", "at least partially", "at least a portion of", "at least one", "at

Art Unit: 1764

least partial” and/or “at least two” in combination with various limitations (see claims 55, 61-62, 70, 77-80, 91, 94, 97, 103 and 105-106); said limitation combinations are not supported by original specification;

- claim(s) 55 and 91 recite “pyrolysis products including (...)” (see lines 9 and 5-6, respectively) which is not supported by original specification, because the original specification only discloses the method wherein the “pyrolysis products consist of pyrolysis gases (...)” (see lines 6-7 of claim 1 as originally filed);

- claim(s) 57-60 and 100-101 recite the pyrolysis at “temperature of about 550-650°C” and/or reaction of pyrolysis gases at “temperature of about 900-1000°C” which is not supported by original specification, because the original specification only discloses pyrolysis at “temperature of 550-650°C” (P2/L30-31) and reaction of pyrolysis gases at “temperature of 900-1000°C” (P3/L2-3);

- claim(s) 63-64 and 104 recite “corundum” as a catalytic material, which is not supported by the original specification, because the original specification only discloses corundum in combination with nickel or nickel oxide as a catalytically active material (P6/L17-18);

- claim(s) 73-74 and 109 recite the heat carrier medium having “a maximum width of about 1-40mm” and/or “an average grain size of about 1-40mm” which is not supported by original specification, because the original specification only discloses heat carrier medium having “an average grain size of 1-40mm” (P6/L9).

11. Claims 55-64 and 70-82 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Feeding of the heated heat carrier medium from the firing back to the pyrolysis reactor, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). In the specification the applicant discloses said recycle of the heated heat carrier medium

Art Unit: 1764

from the firing back to the pyrolysis reactor as critical or essential to the practice of the invention because heat from said heated heat carrier medium is used for pyrolysis in the pyrolysis reactor.

12. Claims 71-72 and 108 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the heat carrier medium including molded metallic or nonmetallic substances, such as steel or ceramic balls, does not reasonably provide enablement for said heat carrier medium comprising "steel objects or ceramic objects". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. It is well established that there must be a reasonable correlation between the scope of the exclusive right granted to a patent applicant and the scope of enablement set forth in the patent application. *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970).

Double Patenting

13. Applicant is advised that should claims 55 and/or 80 be found allowable, claims 81 and/or 82, respectively, will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 91, 93-95, 101-103 and 105-107 are rejected under 35 U.S.C. 102(b) as being

Art Unit: 1764

anticipated by Deglise et al. (USP 4,568,362).

Regarding claims 91, 93-95, 101-103 and 105-107 Deglise et al. discloses method of gasifying organic containing materials comprising:

- feeding the organic containing material into a pyrolysis reactor, said organic containing material exposed to a heat carrier medium in the pyrolysis reactor to cause at least partial pyrolysis of said organic containing material, said at least partial pyrolysis of said organic containing material forming at least two pyrolysis products, said at least two pyrolysis products including pyrolysis gas and at least partially solid carbon containing residue (abstract & drawing);
- feeding at least a portion of said solid carbon containing residue and said heat carrier medium into a firing, said at least partially solid carbon containing residue heated in said firing and forming waste gas and ash, said heat carrier medium being heated by said firing (C2/L67-C3/L23 and drawing);
- feeding at least a portion of said ash and said heated heat carrier medium from said firing to said pyrolysis reactor, said ash and said heated heat carrier medium being combined with said organic containing material in said pyrolysis reactor (C2/L27-C4/L5 and drawing);
- feeding said pyrolysis gas into a gas reactor to produce a product gas having a high caloric value (C2/L27-C5/L3); and
- directing at least a portion of said waste gas from said firing to said gas reactor to at least partially heat said pyrolysis gas in said gas reactor (C2/L27-C5/L3);
- wherein said pyrolysis gas includes condensable substances (abstract);
- including the step of feeding a reactant into said gas reactor with said pyrolysis gas, at least a portion of said pyrolysis gas reacting with at least a portion of said reactant in said gas reactor (C2/L27-C5/L3);
- wherein said reactant includes steam (C2/L27-C5/L3);

Art Unit: 1764

- wherein said at partial reaction of said pyrolysis gas is carried out at a temperature of about 900-1000°C (C4/L5);
- including the step of pretreating said organic containing material prior to feeding said organic containing material into said pyrolysis reactor, said pretreating step including a step of at least partially drying said organic containing material (C1/L54-C2/L35);
- wherein said pretreating step includes a step of at least partially pulverizing said organic containing material (C1/L54-C2/L35);
- including the step of at least partially dedusting pyrolysis gas prior to being fed into said gas reactor (C2/L67-C3/L11);
- including the step of firing at least a portion of said pyrolysis gas to produce heat and using said heat in a process selected from the group consisting of said pyrolysis, said reaction of said pyrolysis gases with said reactant or combinations thereof (C1/L54-66);
- wherein said firing includes a grate firing (drawing).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 55, 59, 75, 77, 79 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362) in view of Olsen et al. (Unit Processes And Principles Of Chemical Engineering).

Regarding claims 55, 59, 75, 77, 79 and 81, Deglise et al. discloses method of gasifying

Art Unit: 1764

organic substances and/or mixtures comprising:

- feeding said organic substances and/or mixtures into a pyrolysis reactor and moving said organic substances and/or mixtures through said pyrolysis reactor (abstract and drawing);
- maintaining the organic substances and/or mixtures in contact with a heat carrier medium so that rapid pyrolysis takes place to at least partially cause said organic substances and/or mixtures to react into pyrolysis products, said pyrolysis products including a solid residue and pyrolysis gases, said pyrolysis gases including a condensable component, said solid residue including carbon (abstract);
- feeding at least a portion of said solid residue and a heat carrier medium into a firing in which said solid residue containing carbon is fired to at least partially form a waste gas and ash (C2/L67-C3/L23 and drawing); wherein
- said heat carrier medium is fire-resistant material having a sufficient mechanical, chemical and thermal stability at a temperature of at least about 600°C (abstract, C4/L35-C5/L3);
- directing at least a portion of heat generated from said firing into said pyrolysis reaction, said generated heat at least partially heating said heat carrier medium (C2/L27-C4/L5);
- feeding at least a portion of said pyrolysis gases and a reactant into a second reaction zone that is at least partially heated by a heat exchanger to form a gas product having a high caloric value, said heat exchanger at least partially supplying heat from said waste gas (C2/L27-C5/L3); and
- removing said ash from said firing and at least partially feeding said ash into said pyrolysis reactor (C2/L27-C4/L5 and drawing); wherein
- said reaction of said pyrolysis gases with said reactant in said second reaction zone is carried out at a temperature of about 900- 1000°C (C4/L5);
- said pyrolysis gases including tar (abstract);
- including the step of at least partially dedusting said pyrolysis gases prior to combining said

Art Unit: 1764

pyrolysis gases with said reactant (C2/L67-C3/L11);

- including the step of firing at least a portion of said pyrolysis gas to produce heat and using said heat in a process selected from the group consisting of said pyrolysis, said reaction of said pyrolysis gases with said reactant or combinations thereof (C1/L54-66).

Deglise et al. discloses that a heat exchanger at least partially supplying heat from the waste gases is used to provide heat to the second reaction zone (as set forth above). Further, the reference discloses that the waste gas after providing some of its heat to the refractory particles, and therefore indirectly to the second reaction zone still has heat available which can be further recovered through indirect heat exchange (C2/L15-17 and C4/L21-29). While the reference does not disclose said indirect heat exchanger being used to heat the second reaction zone, it was well known in the art at the time the invention was made that great economies can often be affected by knowing where in the process heat is produced and where said produced heat can be used to improve process efficiency and to minimize waste therefore whether or not such heat is wasted or recovered (and how it is recovered) is purely a matter of comparative cost of recovering it and its worth (see Olsen et al., pages 1-3). Therefore, as the instant specification is silent to unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to pass said waste gas through an indirect heat exchanger for providing heat to the second reaction zone for the purpose of improving process efficiency and minimizing process waste.

18. Claims 61 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362) in view of Olsen et al. (Unit Processes And Principles Of Chemical Engineering), as applied to claims 55 above, and further in view of Velcich (USP 5,262,577) or Rudolph et al. (USP 3,738,103).

Regarding claims 61 and 63, Deglise et al. in view of Olsen et al. disclose all of the claim

Art Unit: 1764

limitations as set forth above, but the references do not disclose reacting said pyrolysis gases with said reactant in the presence of a catalyst, wherein said catalyst includes a material selected from the group consisting of calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, or mixtures thereof.

Velcich (abstract and C1/L67-C2/L2) or Rudolph et al. (C4/L14-24) teach that reaction of pyrolysis gases with a reactant is improved when it is conducted in presence of catalyst including material selected from the group consisting of calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, or mixtures thereof. Therefore, use of said catalyst in the second reaction zone of Deglise et al. would be obvious to one of ordinary skill in the art, because it would amount to nothing more than a use of a known catalyst for its intended use in a known environment to accomplish entirely expected result.

19. Claims 71 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362) in view of Olsen et al. (Unit Processes And Principles Of Chemical Engineering), as applied to claims 55 above, and further in view of Meunier (USP 4,423,558).

Regarding claims 71 and 73, Deglise et al. in view of Olsen et al. disclose all of the claim limitations as set forth above. Additionally Deglise et al. discloses that said pyrolysis reactor is analogous to that described in French Patent No. 2,436,954 (C2/L27-36). Meunier belongs to the same patent family as said French Patent. While Deglise et al. discloses that the heat carrier medium comprises refractory particles (abstract) the reference does not explicitly disclose said particles selected from the group consisting of sand, gravel, split, aluminum silicate, corundum, graywacke, quartzite, cordierite, calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, steel objects, ceramic objects or mixtures thereof.

Meunier teaches that particles selected from the group consisting of sand, gravel, split,

Art Unit: 1764

aluminum silicate, corundum, graywacke, quartzite, cordierite, calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, steel objects, ceramic objects or mixtures thereof are advantageously used as the heat carrier medium in the fluidized bed pyrolysis reactor, wherein said particles have maximum width of about 1-40mm (C6/L43-59). Therefore, use of said particles selected from the group consisting of sand, gravel, split, aluminum silicate, corundum, graywacke, quartzite, cordierite, calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, steel objects, ceramic objects or mixtures thereof in the fluidized bed pyrolysis reactor of Deglise et al. which is analogous to the reactor of Meunier would be obvious to one of ordinary skill in the art, because it would amount to nothing more than a use of a known heat carrier medium for its intended use in a known environment to accomplish entirely expected result.

20. Claims 56-58 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362) in view of Olsen et al. (Unit Processes And Principles Of Chemical Engineering), as applied to claims 55 and 59 above, and further in view of McIntosh et al. (USP 5,662,052).

Regarding claims 56, Deglise et al. in view of Olsen et al. disclose all of the claim limitations as set forth above. Additionally Deglise et al. discloses that said pyrolysis reactor comprises a fluidized bed reactor (abstract), but the references do not explicitly disclose said pyrolysis reactor includes a moving bed reactor, a rotary drum reactor or combinations thereof.

McIntosh et al. teaches that rotary drum reactors are preferable alternatives to the fluidized bed reactors because they are simpler and offer better control over various process conditions (C1/L31-C2/L40).

It would have been obvious to one having ordinary skill in the art at the time of the invention

Art Unit: 1764

to replace the fluidized bed pyrolysis reactor of Deglise et al. with a rotary drum reactor of McIntosh et al. for the purpose of simplifying operation and providing better control over various process conditions.

Regarding claims 57-58 and 60, Deglise et al. in view of Olsen et al. and further in view of McIntosh et al. disclose the claim limitations as set forth above. Additionally McIntosh et al. discloses that control of the temperature in the pyrolysis reactor allows for control of products produced by said pyrolysis reaction (C4/L34-C5/L56). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to control the temperature of the pyrolysis zone to, among others, temperatures of about 550-650°C for the purpose of improving production of desired products.

21. Claims 62, 64 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362) in view of Olsen et al. (Unit Processes And Principles Of Chemical Engineering) and in view of McIntosh et al. (USP 5,662,052), as applied to claims 55-61 and 63 above, and further in view of Velcich (USP 5,262,577) or Rudolph et al. (USP 3,738,103).

Regarding claims 62 and 64, Deglise et al. in view of Olsen et al. and further in view of McIntosh et al. disclose all of the claim limitations as set forth above, but the references do not disclose reacting said pyrolysis gases with said reactant in the presence of a catalyst, wherein said catalyst includes a material selected from the group consisting of calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, or mixtures thereof.

With respect to Velcich or Rudolph et al. the same comments apply as set forth above.

Regarding claim 70, Deglise et al. in view of Olsen et al., in view of McIntosh et al. and further in view of Velcich or Rudolph et al. disclose all of the claim limitations as set forth above. Additionally Deglise et al. discloses the process further including the steps of:

Art Unit: 1764

- at least partially dedusting and quenching said pyrolysis gases after said reaction with said reactant (C2/L9-14).

22. Claims 72, 74, 76, 78, 80 and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362) in view of Olsen et al. (Unit Processes And Principles Of Chemical Engineering), in view of McIntosh et al. (USP 5,662,052), and further in view of Velcich (USP 5,262,577) or Rudolph et al. (USP 3,738,103), as applied to claims 55-64, 70-71, 73, 75, 77, 79 and 81 above, and further in view of Meunier (USP 4,423,558).

Regarding claims 72, 74, 76, 78, 80 and 82, Deglise et al. in view of Olsen et al., in view of McIntosh et al. and further in view of Velcich or Rudolph et al. disclose all of the claim limitations as set forth above. Additionally Deglise et al. discloses that said pyrolysis reactor is analogous to that described in French Patent No. 2,436,954 (C2/L27-36). Meunier belongs to the same patent family as said French Patent. While Deglise et al. discloses that the heat carrier medium comprises refractory particles (abstract) the reference does not explicitly disclose said particles selected from the group consisting of sand, gravel, split, aluminum silicate, corundum, graywacke, quartzite, cordierite, calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, steel objects, ceramic objects or mixtures thereof.

With respect to Meunier the same comments apply as set forth above.

23. Claim 92 and 100 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362), as applied to claim 91 above, and further in view of McIntosh et al. (USP 5,662,052).

Regarding claims 92 and 100, Deglise et al. discloses all of the claim limitations as set forth above. Additionally Deglise et al. discloses that said pyrolysis reactor comprises a fluidized bed reactor (abstract), but the references do not explicitly disclose said pyrolysis reactor includes a

Art Unit: 1764

moving bed reactor, a rotary drum reactor or combinations thereof, wherein said pyrolysis is carried out at temperature of about 550-650°C.

With respect to McIntosh et al. the same comments apply as set forth above.

24. Claims 97 and 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362), as applied to claim 91 above, and further in view of Velcich (USP 5,262,577) or Rudolph et al. (USP 3,738,103).

Regarding claims 97 and 104, Deglise et al. discloses all of the claim limitations as set forth above, but the references do not disclose reacting said pyrolysis gases with said reactant in the presence of a catalyst, wherein said catalyst includes a material selected from the group consisting of calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, or mixtures thereof.

With respect to Velcich or Rudolph et al. the same comments apply as set forth above.

25. Claims 108-109 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deglise et al. (USP 4,568,362), as applied to claim 91 above, and further in view of Meunier (USP 4,423,558).

Regarding claims 108-109, Deglise et al. discloses all of the claim limitations as set forth above. Additionally Deglise et al. discloses that said pyrolysis reactor is analogous to that described in French Patent No. 2,436,954 (C2/L27-36). Meunier belongs to the same patent family as said French Patent. While Deglise et al. discloses that the heat carrier medium comprises refractory particles (abstract) the reference does not explicitly disclose said particles selected from the group consisting of sand, gravel, split, aluminum silicate, corundum, graywacke, quartzite, cordierite, calcium/magnesium oxide, dolomite, calcite, corundum, nickel, nickel oxide, nickel aluminate, nickel spinel, steel objects, ceramic objects or mixtures thereof.

With respect to Meunier the same comments apply as set forth above.

Art Unit: 1764

26. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

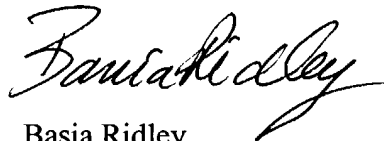
27. In view of the foregoing, none of the claims are allowed.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).



Basia Ridley
Examiner
Art Unit 1764

BR
May 5, 2004